Agricultural Extension Service ● University of Minnesota

FACT SHEET

AGRONOMY NO. 16—1970

Row Width for Corn and Soybeans

DALE R. HICKS, HARLEY J. OTTO, and
PAUL R. HASBARGEN

Corn and soybean growers should consider the following factors in choosing row width:

1. Possible yield increases.

   A. Corn—Trials were conducted at Waseca in 1962-64 and at Lamberton in 1963-64 using 20-, 30-, and 40-inch-widths between rows. With each row width, plant populations of 16,000 to 31,000 plants per acre were grown at Waseca and 16,000 to 25,000 plants per acre at Lamberton.

   The results were somewhat variable from year to year and from one population to another. Average yield increases of about 9 percent resulted for 30-inch compared to 40-inch rows at the optimum plant population. At the optimum population, the average increase at Waseca was about 8 percent and 11 percent at Lamberton. The difference in yield varied from an increase of 17 percent to a decrease of 6 percent for 30-inch compared to 40-inch rows. Corn yield in 20-inch rows was about equal to that in 30-inch rows.

   The highest yields were obtained with populations of 18,000 to 25,000 plants per acre at Waseca and 18,000 to 21,000 at Lamberton at all row widths.

   These tests were conducted under high fertility conditions.

   Studies conducted in 1967 and 1968 at Rosemount revealed an 8 percent yield increase for 30-inch compared to 40-inch row spacings. In the 1968 study, yields in 20-inch rows were 11 percent higher than in 30-inch rows.

   B. Soybeans—Row spacings for soybeans have been compared in numerous tests over the past several years. The following conclusions can be drawn:

   (1) Highest yields are normally obtained with full-season varieties planted in narrow rows during mid-May. Yield increases of 6 to 25 percent have been obtained in 24- compared to 40-inch rows.

   (2) When yields in narrow rows are compared with those of wider rows, the largest yield increases are normally obtained with earlier than full-season varieties and with later-than-normal planting dates. (However, maximum yield is obtained with full-season varieties planted early in narrow rows.)

   (3) Work in Minnesota was initiated in 1968 to study yielding ability of several varieties in row widths of 6, 20, and 30 inches at four locations. In general, maximum yields were obtained in 20-inch row spacings; however, some varieties yielded slightly higher in 6-inch rows. Extremely narrow rows (6-8 inches) may hold some promise for the future if weeds can be controlled consistently.

2. Cost analysis—Additional costs are incurred by changing to narrow rows. Tables 1 and 2 show estimates of the added cash costs and investments of a group of Minnesota farmers who changed to narrow rows. Table 3 summarizes the cost increases assuming several different acreages. Note that if corn acreage is over 200, a yield increase of less than 4 bushels would cover the added cost (at a price of $1 per bushel). About 1 bushel increase in soybean yield will pay the added costs if there are 200 or more acres.

Table 1. Effect per acre of row spacing of corn and soybeans upon selected cash operating costs

Factor	40-inch rows	30-inch rows	Change to narrow spacing
	Corn		
Seed	$ 4.50	$ 5.00	+ $ .50
Insecticide	2.00	2.60	+ .60
Herbicide	3.15	4.10	+ .95
Fuel and oil*	1.00	.75	- .25
Total	$10.65	$12.45	+ $1.80
	Soybeans		
Seed	$ 3.00	$ 4.00	+ $1.00
Herbicide	3.00	4.00	+ 1.00
Fuel and oil*	.90	.70	- .20
Total	$ 6.90	$ 8.70	+ $1.80

* Calculated on basis of changing from four row to six row planters and cultivators and from two row to three row combine heads and of reducing cultivations from two to one.

Table 2. Effect of row spacing on selected capital requirements

Investment	40-inch rows	30-inch rows
Planter	4 row $1,500	6 row $1,900
Cultivator	4 row 775	6 row 1,000
Combine head	2 row 1,900	3 row 3,200
Total	$4,175	$6,100
Annual use cost (20%)	$ 835	$1,220

Table 3. Average cost increase from shift to narrow rows for corn and soybeans at various acreage levels*

Acreage	Cost increase per acre	
	Corn	Soybeans**
100	$5.65	$3.05
200	3.75	2.45
300	3.05	2.20
400	2.80	2.10

* Based on cost data in tables 1 and 2.

** Cost increase is less for soybeans since no added investment is needed for harvesting.

3. Present production practices—If a grower is not now producing at a high yield level, he should consider investing in other production practices such as fertilizer, better weed and insect control, higher plant population, better varieties and hybrids, etc. rather than new machinery for narrow row crop production.

4. Acreage of corn and soybeans—If only small yield increases are expected, a large total acreage of corn and soybeans is necessary to justify trading machinery. But, if the acreage is very large and 6- or 8-row equipment is already being used, a shift to narrow row equipment may be impractical because of the additional working time required—unless larger narrow-row machinery is purchased.

5. Machinery available—On most Minnesota farms, it is most practical to use the same row width for all row crops. Until recently, general use of narrower rows has been limited by the unavailability of harvesting equipment for narrow-row corn. However, harvesting machinery is now available for corn and shouldn't prevent switching to narrower rows (30-inch or less) for both corn and soybean production.

   Equipment which harvests shelled corn in 3-, 4-, or 6-row widths (row widths of 30 inches or less) is commonly available on a commercial, or sometimes an experimental basis.

   If ear corn harvest is desired, 2-row pull-type and 3-row self propelled pickers for 30-inch rows are available. Silage choppers in 1-, 2-, and 3-row units adapted to 30-inch row spacings are also available so narrow row corn can be harvested for silage.

   If a grower changes to field shelling to accommodate narrow rows, he must also consider changes in his handling and storage practices, since shelled corn can't be stored with as high moisture content as ear corn. Consider the following alternatives: (1) artificial drying on farm, (2) commercial drying, (3) wet corn storage for livestock feeding, and (4) selling wet corn at harvest with a discount.

6. Condition of presently available machinery—The logical time to change to narrower rows is when most or all of the machinery needs replacing. If only a planter or cultivator is to be replaced, consider purchasing equipment that can be adjusted to the narrower rows later.

7. Selection of corn hybrids—Hybrids of proper maturity, with high yield potential and good lodging resistance, are available for use with the more intensive management systems. Consult your seed corn dealers and Extension Service personnel for help in selecting suitable hybrids for narrow row, high plant population management.

8. Planting rates and plant populations—University of Minnesota data indicate that plant populations that give maximum corn yields are the same in both 30- and 40-inch rows. For soybeans, the optimum plant population is 125-150 thousand plants per acre. As row width becomes narrower, the number of plants per foot of row must change to maintain the desired population. At harvest, stand counts of 11-12, 8-9, and 5-6 plants per foot of row are needed for the optimum population of 40-, 30-, and 20-inch rows, respectively. This would require about 12, 10, or 7 seeds per foot at planting to allow for some mortality.

9. Weed control—Successful production in narrow rows depends on adequate weed control. Herbicides can be helpful, but won't eliminate the need for sound cultural practices. Growers who have been using 14-inch bands of herbicides in 40-inch rows will need about one-third more chemical in 30-inch rows if the same band width is maintained. By using narrower bands, the same amount of chemical per crop acre can be used; however, this may slow cultivation to some extent.

   The decision on row width is complex; each corn or soybean grower will have to consider many factors before selecting a row width. Those doing an excellent job of producing corn now may increase yields further with such a shift. Others might profit more from improving other production practices first.

Issued in furtherance of cooperative work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Roland H. Abraham, Director of Agricultural Extension Service, University of Minnesota 55101.